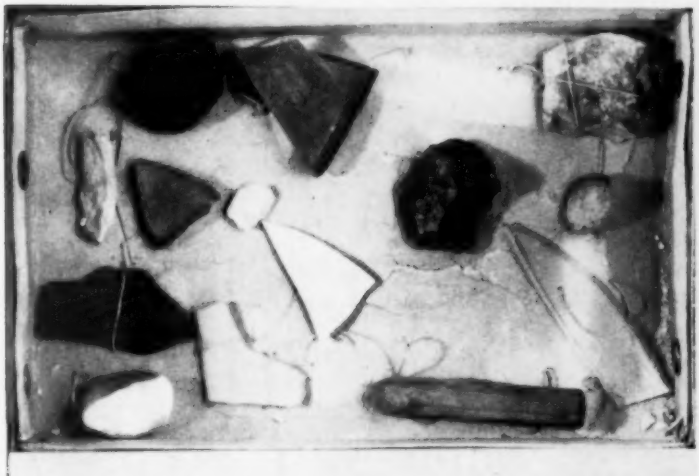
Earth Science

Rockhounds' NATIONAL Magazine



WAS ABRAHAM LINCOLN A ROCKHOUND?

35¢

August Issue, 1959

Earth Science®

$2 a YEAR

Vol. 12, No. 4

Official Publication of the Midwest Federation of Mineralogical Societies.

Published Bi-monthly: February, April, June, August, October, December, at Mount Morris, Illinois

Second Class Mail Privileges Authorized at Mt. Morris, Illinois

CONTENTS, AUGUST ISSUE, 1959

PUBLISHED BI-MONTHLY by The Earth Science Publishing Company, Incorporated, Editorial and Circulation Offices, Box 1357, Chicago 90, Illinois. *Business Manager,* Dr. J. D. Willems; *Treasurer,* Orval M. Fether; *Advertising Manager,* Earl D. Cornwell; *Subscription Manager,* William H. Allaway. • SUBSCRIPTIONS: $2.00 per year, United States and its possessions, and Canada; elsewhere $2.50. Advertising rates on request. Address Box 1357, Chicago 90, Illinois. • EDITED by Ben Hur Wilson, 406 Grover St., Joliet, Illinois; *Associate Editor,* William H. Allaway; *Club Editor,* Mrs. Bernice Rexin; *Editorial Staff,* William A. Bingham, Frank L. Fleener, Russell P. MacFall, Kirtley F. Mather, H. H. Nininger, Willard H. Parsons, Richard M. Pearl, J. Daniel Willems, C. W. Wolfe, H. P. Zuidema. • EARTH SCIENCE is receptive to articles of earth science interest. Manuscripts, photographs, sketches will not be returned unless accompanied by ample first-class postage. Permission to quote or reprint articles from this magazine will be considered upon written request. Communications for editorial consideration should be sent to the *Editor in Chief,* Ben Hur Wilson, 406 Grover St., Joliet, Illinois. The Earth Science Publishing Company makes every effort to select its articles and advertising carefully in order to merit the confidence of our readers, but assumes no responsibility for the statements and opinions expressed by contributors and/or advertisers in the magazine. • CHARTER LIFE SUBSCRIBERS: John C. Bohmker, R. E. Caliga, H. D. Cohn, J. E. Farr, H. T. Perry, Theodore C. E. Reich, Sr., Chicago Rocks and Minerals Society, Earth Science Club of Northern Illinois, Marquette Geologists Association. (These subscriptions are available at $50.00.)

Editor's Memo Pad

KEEPING HISTORY STRAIGHT: This really is a problem—one upon which many of us might be able to help. If the old saying, "You can't believe more than half what you read in the papers," is only half right, then about one fourth of what is written is either fiction or the truth stretched out of all proportion, to suit the purpose or the whim of the writer.

If one were to write the history of the present day, one hundred years from now, using as a source only a single publication, what a warped account this might be, because much of our modern journalism is either slanted towards the individual likes or dislikes (prejudices) of the writer, or in the direction of whatever pressure group is able to exert the most influence.

For example—when was gold first discovered in California? Who first discovered radium, Madam Curie, or some Russian scientist? What is the true history of many of the famous gem stones of the orient—and so on down the line. Even when one has at his command several versions of the same event or story, he is apt to choose the one which he likes best, and when these versions are all blended together, the happenings related tend to take on local color, and to become merely legend or a tradition. The one that sounds best, and best suits the fancy of the community involved, perhaps as a tourist attraction, usually wins out. One need only read the various versions of many of our "lost mine" stories to be convinced of this fact.

It is the privilege and duty of the historian to first gather together all known facts concerning his subject, to then evaluate them and their sources as best he can (laying aside his own personal opinion), and to analyze this source of material in the light of its possibilities and impossibilities. Then, and only then, should he proceed to state the facts as supported by the evidence as he sees it. Obviously no two authors seldom then see everything exactly alike, so therefore the reader still may have a chance to draw his own conclusions.

Why all this apparent harangue about history? Well—there is plenty that might be said about "Keeping history straight" that is of particular interest to Rockhounds, which might be applied to many phases of our hobby, but not to belabor the point unnecessarily we will speak only of a few of the most relevant. For instance, the matter of planning and reporting our field or collecting trips. How easy it is to give only rather vague or indefinite directions, which on the other hand should be most accurate and specific. Many a field trip has been spoiled by parties getting off on the wrong road, becoming separated, causing some participants to go home empty handed and very much disappointed.

Equally important is the matter of giving specific information concerning the location of a "find." Where numerous stops are made on a single day's trip, it is often so easy to mislocate the place of origin of a good or rare specimen, which one might later wish to return to—and above all else the exact geologic strata where found should be well noted. If unknown, sufficient descriptive information should be obtained (fossils, etc.) to permit some one better versed in the geology of the region to do so.

Finally, the matter of proper identification and labeling should be done with utmost care. The value of many a fine specimen has been greatly depreciated due to lack of specific or exact information thereon. Not only the location and mineralogical name should be given but also its origin, source, and cost (if purchased)* should be noted. We would recommend most highly a special catalogue card, prepared and published by Frank Sadilek, 1308 W. 42nd, Des Moines, Iowa, who will gladly send you a sample card upon request.

*Cost may be given in code.

* * * *

BORING WITHIN: Our factual knowledge concerning our sub-surface environs is woefully weak. Working man has penetrated the earth for more than a mile in only a very few places. Man's deepest penetration to date was achieved when a "dry" well in Texas was sunk to a depth of 25,340 feet, a little less than five miles, without finding oil.

A committee of the National Academy of Sciences estimates that it will cost 5 or 10 million dollars to get down to an interesting level. This may seem like a substantial outlay, but think of all the money that has been sent in the opposite direction to plumb outer space.

The surface layer of the earth is known as the mantle, the crust lying below it. The boundary between the two is known as the Mohorovicic Discontinuity—Moho, for short. Nobody has ever got down to Moho, but at that level the heat is thought to be 600°, so the auger would be pretty close to impinging upon the preserves of Beelzebub, yet this would only be about half as hot as the temperature that would be generated by a space ship penetrating our atmosphere in the act of returning to the Earth's surface.

It has been estimated, that at a depth of 72 miles, the Earth's temperature would be great enough to melt even the most refractory rocks. These layers are in a continual state of flux, and would melt and flow like lava, were the great pressure under which they exist to be released.

STRAIGHT COLLECTION FINDS A HOME!

The widely known, outstanding collection of the late H. R. Straight—former President of the Midwest—was bequeathed to the Central Iowa Mineral Society of Des Moines, with the request that it be placed in a permanent home where it could be preserved intact, and be of value and interest to science and the viewing public.

Arrangements have now been made by "Central Iowa" and Drake University to house the entire collection, on a permanent loan basis, on the Drake Campus in Des Moines. A large room in the Administration Building is being specially prepared for the exclusive display of this collection. It is expected to be ready for the public's enjoyment by mid-summer.

Thousands of rockhounds have seen some of the many choice specimens of this collection in the displays which Mr. Straight made at many Midwest and National Conventions. Now all rockhounds are cordially invited to see this superb collection when in Des Moines.

The exhibit room will be open to the public, without charge, Mondays thru Saturdays, during hours when Drake University is regularly open. Visiting Rockhounds are requested to sign the Visitors Register.

Reported by Hubert Ward

* * * *

A NICE THING TO DO: Frequently clubs and program chairmen feel under special obligation to some guest speaker who may have made extra preparation and effort to put on a fine evening program, and may even have gone to considerable expense for which he will accept no recompense. Here is a suggestion which many have found to be a way out. Why not give him a year's or even a three years' subscription to Earth Science magazine, and as each new issue comes through the mails, it will be a pleasant reminder of both the occasion and the donor.

* * * *

HAZELTONITE:—Hot news on a new cerium mineral. Yes!—a new mineral species, and named for a woman, Hazel—whose innate curiosity led to its identification: Found as a pinkish adulterant of the micaceous pegmatites mined about Paris, Maine, this new mineral, should it exist in sufficient quantities, could prove a God-send to our strategic command.

The alloys of cerium are of utmost importance in building satellite nose-cones capable of withstanding the great heat generated on their return to Earth through the atmosphere. To date the only source of this rare-earth element has been Sweden, from which large quantities are imported.

OUR AUTHORS: Edwin Goff Cooke, writing on Southwest Archeology, gives us a very good insight into what goes on, and what has gone on, in an exotic region seldom, if ever, visited by the most of us. The author is a perfectionist at heart, and his keen observations make for very interesting and informative reading. His excellent article on "Triple Peak Divide" in our May 1954 issue is among our very best. Photographs were made by the author and Mrs. Cooke who appears in the background.

Russell Kemp, our author who so ably tells us the story of the "Grotto of the Redemption," is a member of the Chicago Lapidary Society, and assisted by his wife Doris edits "The Template" (club bulletin of their society), in which the article was originally published. They are also associate editors of the National Bulletin Editors News, and are quite active in the Midwest Federation assisting Gus Brown in the promotion of annual Federation sponsored regional shows, known as Rockramas and described elsewhere in this issue of Earth Science.

Russell MacFall, night editor of one of the Middle West's great daily newspapers, the Chicago Tribune, writes glowingly of one of this section's natural advantages, the five Great Lakes. He is widely known as the author of the popular Gem Hunter's Guide, recently revised and reprinted, as well as articles in Science and Mechanics and other magazines. See his "Unique Indian Jewelry Made in the Southwest" in Earth Science, May-June 1954, and "Gem Materials for the Amateur," Sept.-Oct., 1954.

Lew Birdsall, author of our article on Oregon Agates, is an authority on this fascinating class of minerals. He is an officer of the Oregon Agate and Mineral Society, host club to the American and Northwest Federation Convention in Portland over Labor Day weekend.

* * * *

OUR COVER PHOTO: Abraham Lincoln may have been interested in rocks and minerals, but to what extent we are quite uncertain, for in the Harlan-Lincoln Home shrine on the campus of Iowa Wesleyan College at Mount Pleasant is a small box containing a few nondescript rocks which were the cherished keepsakes of Lincoln's grandson, Abraham "Jack" Lincoln. At any rate Lincoln's signature on the lid of the box appears to be genuine, and we know that "Jack" as a boy spent much time at the home of his grandfather, the Honorable James Harlan who was a member of Lincoln's cabinet.

Ed. Note: For additional information concerning the Lincoln Rock Collection see comment in October, 1954 issue of Earth Science, page 12. B.H.W.

NEW MINERAL MUSEUM

Rockhounds driving through West Virginia this summer, or going South in the winter, will be welcome to visit the new Mineral Museum located at Follansbee, built and operated by "Jim" Smedley, who writes that he has "collected minerals in 30 states, and in Mexico," and has some very fine mineral specimens on display that are worth seeing. We hope that many of our readers will give him a call.

Smedley's new Mineral Museum located at Follansbee, West Virginia

* * * *

GEMS: Geologists recognize only four stones as precious; diamonds, rubies, emeralds, and sapphires. Other stones may be classed as semi-precious or ornamental.

RECOMMENDED READING

"REVIVAL of Geology in the Pennsylvania High Schools," by John H. Moss, published in the June issue of GEOTIMES, presents a realistic appraisal of the great upsurge of interest in the subject of Geology in that State.

This is indeed heartening to those who appreciate the value of Earth Science as a cultural study, as at the present time no more than 5% of our secondary schools offer any form of geologic subjects in their curriculums. Insofar as most High Schools are concerned Geology is as dead as a "Dodo" and has been for more than 50 years.

* * * *

"Gleanings from the Editor's Reading," by Gerald Ostrom, April issue of *The Pick and Dop Stick*. Editor Ostrom lists nearly five pages of gem and mineral locations in the Midwest and Northwest that he found mentioned in other club bulletins. A wonderful reference if you are planning a vacation in these areas.

* * * *

"Field Trip in Australia," by Muriel C. North. April issue of *Gem Cutters News*. A very interesting account of a field trip made along Sara River by the Lapidary Club of New South Wales, Sydney, Australia. Sapphires, zircons, topazes, and an 8 ounce citrine were found. At night an old miner told the group tales about the days when the Chinese mined this area for gold and tin.

Midwest Club News

Mrs. Bernice Rexin, Club Editor

3934 N. Sherman Blvd.
Milwaukee 16, Wisconsin

TRI-COUNTY ROCKS AND MINERALS SOCIETY has made arrangements with the Saginaw County Fair Board to hold an exhibit of minerals and lapidary work at the Saginaw County Fair, September 13-19. This is the second largest county fair in the United States. A new hobby building is being erected on the fair grounds and one-half of its space or an area 40x100 feet will be devoted to mineralogical and lapidary displays. Eighty locked cases will be available for individual entries, with no rental charge. There will be eight booths, 8x10 feet, for society displays. All societies in Michigan have been invited to participate in this exhibit. A two-foot trophy will be awarded for the best society display and ribbons will be awarded to winning individual entries.

MESABI ROCK AND MINERAL CLUB held its first meeting on May 25 and elected Dominic Ramponi, Buhl, Minnesota as its first president. Plans were made to incorporate the club and to join the Midwest Federation of Mineralogical and Geological Societies. Anyone who is interested in this new society should contact its secretary, Richard Lake, Box 361, Chisholm, Minnesota. Phone: CL 4-4028.

MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY on May 15 heard Dan Printup and Charles Barfield give an illustrated talk on "The Importance of Photography to Archeology and Geology." Quartz, calcite, pyrite, magnetite, garnet, hematite and some rare minerals were collected by the group on its recent trip to Magnet Cove and Mt. Ida in Arkansas.

MICHIGAN GEM AND MINERAL SOCIETY exchanged speakers in April with the Flint Rock and Gem Club. Dr. Benjamin Moulton, Professor of Geology and Geography at Flint Junior College, spoke to MG&MS on April 9 about his trip to Alaska last summer, and Hugh Jameson showed FR&GC his film on gem-cutting, "Gift of the Ages," on April 16.

GRAND RAPIDS MINERAL SOCIETY heard the story of the first man-made diamonds at its May meeting. William K. Cordier, one of the five scientists at General Electric who accomplished this historic feat, told of man's earlier attempts to make synthetic diamonds, discussed the economic significance of G.E.'s success and displayed samples of the man-made diamonds.

WISCONSIN GEOLOGICAL SOCIETY on May 11 visited the Kettle Moraine area via colored slides and a talk by Dr. Harvey Uber who is an expert on this region in Wisconsin. He discussed both the historical and geological aspects of the area.

CHICAGO LAPIDARY CLUB was recently shown how to make spheres in the kitchen with an electric mixer converted into a sphere machine. Inventive CLC member Al Upson, who developed this method, also showed the group some very good spheres that he had made with the electric mixer.

Presently CLC is busy preparing a permanent display of cabochons, faceted gems and silverwork for the Illinois State Museum in Springfield, Illinois.

WANTED: The name and address of the president of any club in the Midwest that is not affiliated with the Midwest Federation or any other Federation. If you have this information, please send it to Gus Brown, Midwest Federation Membership Chairman, 819 12th St. Place, Des Moines 14, Iowa. Mr. Brown has prepared literature containing information that is very useful to societies, which he will send free of charge to anyone who requests it.

FLINT ROCK AND GEM CLUB on May 21 heard a joint lecture on "Mexican Minerals and Jewelry," by Edward Brigham and Maurice Overholt. Both Mr. Brigham and Mr. Overholt have traveled extensively in Mexico and Mr. Overholt also spent a year studying silversmithing in Taxco, Mexico's famous silver center. The talk was beautifully illustrated with colored slides and samples of Mr. Overholt's exquisite silver work.

ST. LOUIS GEM AND MINERAL SOCIETY recently heard Edwin Wolf discuss "Gem Hunting in North Carolina." Carolina's finest gems are found in Cowee Valley, which at one time was mined for rubies and rhodolite garnets. The rhodolite garnet is a fine shade of light red without the dark aspect that belongs to most garnets. It possesses a remarkable degree of brilliancy, especially in artificial light. Mr. Wolf showed specimens of gems that he had collected in Carolina and maps on which he had marked the best hunting areas.

INDIANA GEOLOGY AND GEM SOCIETY on May 8 heard a talk on "Indian Tools," by Roy Fiscus, who also displayed a number of excellent Indian artifacts.

The society is planning to make a fluorescent picture to exhibit at the Indiana State Hobby Show this summer.

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"Southwestern Archeology"

by EDWIN GOFF COOKE

"Those ancient villages . . . stand as visible reminders of an enlightened, though primitive, people who played a most important part in the conquest of our arid Southwest centuries before European mariners dreamed of a New World; they merit restoration and protection as an irreplaceable inheritance of our Nation from its pre-historic predecessors."

Neil M. Judd

In 1906, the National Congress of our United States enacted both the National Antiquities Act and the National Monuments Act to protect and preserve our major antiquities, particularly ruin sites from exploitation, spoliation, private monopoly and commercialization. The Acts further protected the sites and areas described as Monuments from the ravages of irresponsible pot-hunters and the human erosion practiced by inconsiderate souvenir gatherers.

By nullification of the National Monuments Act under the guise of retrenchment and supposed national economy, the Monuments would revert back to the control of the various States, where, no doubt in time, and again under the hue and cry of state economy, they would revert to in most instances private enterprise and privileged exploitation. Though so far special interests have not been able to effect the return of the Monuments to the States, they have been able to on

"Chettro Kettle Ruin." Region was center of Great Chaco Culture. Completely evacuated some time shortly after 1300 A.D. Later inhabited by incoming roaming Athapascans.

occasion bring about through legislation, reduced budgets for the Department of the Interior, affecting the National Parks and Monuments, whereby personnel has been reduced below the minimum requirements for adequate protection and supervision. Furthermore, such so called legislated economy has retarded continued investigatory research, stabilization, rehabilitation and proper custodianship.

In the southwest, prior to the National Monuments Proclamation nearly every easily reached and accessible ruin was a Sunday and Holiday picnic Mecca for every pot-hunter, sherd gatherer, artifact collector, souvenir grabber and vandal in the region. Each new ruin find heralded a bonanza, and precipitated a rush of both organized and disorganized groups that included persons of every degree of interest, from researcher to vandal. Such ravaging forages in some instances so completely depleted the area of all evidence that only the standing masonry was left as mute evidence that it had once been long ago, a habitation of the ancients.

The valuable and irreplaceable material that was removed from the sites became scattered in every direction. Wagon loads of filled crates, boxes and barrels were shipped to various museums and foreign countries, particularly Europe. Many large removals become the property of private ownership and commercial enterprises.

Walnut Canyon Ruins is a regrettable example of such depredations. The story of the early people, who, from time to time, inhabited and erected cliff homes there, is very incomplete. Not only pages, but whole chapters, and in some instances an entire volume of their history was appropriated by predators and other trespassers, some of whom not satisfied with their spoils, pushed over entire outer walls of masonry. Perhaps, it was nothing more than the crashing noise of the falling walls, the ghostly reverberation of bouncing rocks and the crescendoing echoes that again wakened the stillness of the canyon, that prompted such child's play; who knows but such wilfulness provoked one writer to ascribe and author Walnut Canyon as, "The National Monument to Vandalism."

The Canyon ruins, not far from Flagstaff, Arizona, was first discovered in 1883 and from there on was a happy hunting ground until it was declared a Monument in 1915, but vandalism continued to be practiced at the site until a permanent resident custodian was appointed in 1934.

In the highly eroded and denuded desert wastes of the upper San Juan Basin, the magnificent and now famous Chaco Canyon Ruins suffered to a somewhat lesser degree the indiscrimination of irresponsible pot hunters. It is told that, "one early entrepreneur who tried to establish a trading post there, offered all the relics you could dig and carry merely for the rental of the horses and wagons to and from the site and the payment of your board and keep while there". The enterprise failed. Why? No one will say but many can guess. Nevertheless, a great quantity of identifying material must have been removed from the ruins during the interim.

Historically, Chaco Canyon Ruins, were not officially discovered and recorded until 1849. At that time Lieutenant J. H. Simpson, United States Army Engineer, surveyed, wrote descriptions and drew ground plans of five of the eighteen major ruins. Beginning in 1878, various individuals, organized expeditions, museums and societies, from time to time investigated and excavated the ruins. Exceedingly little of their findings is to be found in the small and inadequate museum that one finds there today.

The area did not come under protective custody until 1907, at which time it was proclaimed as a National Monument. Twenty years later, in 1927 the National Park Service initiated further excavations and stabilization. World War II halted the continuance of such protective work and it was not resumed again by the Park Service until 1946.

A quite similar history could be written

Lower White House Ruins, in Canon DeChelly, New Mexico. Built by Early Anasazi who erected many other pueblos both in Canon De Chelly and nearby Canyon Del Muerto. Earlier Pithouse People lived in the Canyon where Navajo farmers now reside. Invaded by Early Spaniards, and later scene of "Carson's Folly."

about the Aztec Ruins that are located in the fertile valley of the Animas River that flows immediately to the north of Chaco. There the first immigrant settlers and later the citizens of the newly established village carted away nearly all of the great timbers and other building woods that had been used in the construction of nearby Aztec Pueblo. No doubt, much of that material because of its age and dryness, eventually was used as fuel in a fireplace or stove. Of course, it is to be remembered that, to those early newcomers the ruins represented little more than an incomprehensible pile of rubble that was anybody's want and claim. First come first served. No one knew and more cared less about the antiquity and the historic importance of those archeological mounds of tumbled masonry.

All of the foregoing mentioned site incidents, though few in number, are illustrative of what happened in kind to nearly all early ruin finds before they came under the jurisdiction of some protective custody. Today there are several states whose laws prohibit the removal from (without permission), or the destruction of any materials located in or on any ruin site, whether it be named or unnamed.

Some years ago in 1922, an eminent man of medicine, and archeologist, wrote: "The bibliography of American archeology is more extensive than comprehensive and much more theoretical than practical". Now, 37 years later that statement is still quite applicable to the present situation.

Despite the many separate investigations and important revelations of recent date, much confusion still exists as to the origin and antiquity of the early builders of cultural centers and their predecessors in the Americas. Perchance, much of the confusion has arisen from the seeming lack of cooperation of researchers, investigators and institutions interested in the subject, and their failure to compile, codify and coordinate their independent findings.

Most likely, the already mentioned confusion and lack of organized cooperation are possibly due to the general apathy and lack of interest on the part of the American public both past and present. Of a consequence, support and financial assistance has been, and still is, indeed meager compared to monies subscribed

and alloted for other oftentimes whimsical researches. In reviewing the situation, it is to be borne in mind, that the antiquity of man is still in this enlightened age not a very popular topic with many individuals and groups of our citizenry who prefer to remain uninformed, prejudiced and biased. For various reasons, the attitude to remain unenlightened is particularly true when it concerns the pre-history and the ancestry of our North American Redman and his predecessors.

Much of our present day literature is fraught with misinformation that has its origin in the unqualified and dogmatic statements made by early independent researchers, whose work was very limited and quite superficial. In a recent publication dealing with the antiquity of early man in the Americas, the writer, in a short and incomprehensive paragraph disposed of the American Redman and his ancestry by stating, "Of course you know that the American Indian is basically a Mongoloid," and that, "At sometime toward the end of the glaciation period they began to move over from Asia to America."

From such statements, as has been cited, it is quite apparent that present day literature on the subject, is still cursed with undue haste and biased conclusions. One authority on the subject considers the enormity of such literature on the matter more of a monument to our ignorance than our erudition.

It is generally recognized that our present day information on the antiquity of man in the Americas is not at all definite, conclusive, nor free from contradiction. For the most part, it is agreed by scholars, that early man in the Americas was an Asiatic who infiltrated the western hemisphere via the Ameriasian arctic landway that has existed, at various intervals, in geologic history. As there is no proof of mass migrations, it is thought that the early people came in varying numbers, wandered in diverse directions and settled in some instances far from one another.

Fortunately, of recent years there have been scholarly discernments that do shed some light on the subject of the race origin of the early migrators whose remains are to be found in the southwest and elsewhere in the Americas. Dr. Leland C. Wyman in his study of blood types of dehydrated tissues taken from 226 pre-history human burials in the Americas, including Alaska and the Aleutians, determined the possibility of four separate periods of migrations of separate

"Great Sanctuary," Chettro Kettle Ruin. In Chaco Canyon, Upper San Juan, New Mexico.

blood types. His research revealed that the agglutinogen factors A and B were present in the blood of the early migrants and that they were of separate blood groups recognized as A, B, A plus B and O.

Such blood typing of skeletal remains is most interesting, revealing and incitive, in view of the fact, that blood tests of present day full blood Redmen in North America show them to be predominantly O type, while similar tests of full bloods among the Gahans of Terra Del Fuego and the Carajas of Brazil reveal a remarkably high percentage of B factor.

From Wyman's discoveries one can readily reason that the agglutinogen factors A and B found in some of our today's Redmen is not because of transmutation alone since the arrival of Europeans on these shores.

Added thereto, studies of the craniums of unearthed remains of the purported to be earliest people to inhabit Mesa Verde, namely, Basket Maker I and Basket Maker II, proved them to be different than the craniums of the Pueblo builders who arrived at a later date. A date which is generally agreed to have been about 700 A.D. Furthermore, they contrast with the skulls of the Athapascan people who infiltrated the southwest at a much later date. The discerned differences were not in type and shape alone, but in the sutural complexities as well.

While such observations in themselves cannot be depended upon as a lone criteria to conclude that the early people were of different races, they do more than merely indicate an admixture of different racial strains. Perhaps, the noted racial differences in the cranial and blood studies were the result of cohabitation with and the assimilation of other racial groups during their long meandering trek from their original homeland.

The mentioned considerations do not in themselves prove anything, but they do provide doubt that the scientifically named Neanthropus Americanus is basically or originally mongoloid. That his ancestry was Asiatic, is not to be entirely denied. Neither is the greatly varying degree of determined and accepted mongoloidal characteristics to be refuted. However, the inherent physical mongoloid racial traces may have been the end result of long association and close affinity of their forbears with other Asiatic people during their nomadic peregrinations before reaching America.

A little more than ten years ago new finds of primitive artifacts on the great northern Alaskan plateau tended to sub-

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"Great Sanctuary," Moat Wall is directly behind Circular Kiva, Chettro Ruin.

Book Reviews

RESEARCHES IN GEOCHEMISTRY. Philip H. Abelson, editor. John Wiley & Sons, Inc. 1959.

This work is a collection of the papers presented during a seminar series in geochemistry at the Carnegie Institution of Washington and at Johns Hopkins University during 1957-58. Twenty-five U.S. and foreign scientists, including Willard F. Libby of the Atomic Energy Commission, contributed.

The role of chemistry in geological processes is being increasingly recognized as worthy of intensive research. The seminar and publication of the lectures were planned in order to correlate independent work recently conducted in individual laboratories. Some of the topics discussed are nuclear geology, isotopic sulfur, geochronology, chemical environment of ore deposition, and geochemical prospecting.

Geochemistry is a fast-developing field. The Geophysical Laboratory of the Carnegie Institution, of which Dr. Abelson is director, has made a significant contribution to the literature on it by lending his talents for the editing of the present volume. M.G.C.

VECTOR SPACE. Martin J. Berger, Director of the School for Advanced Study in Mineralogy and Crystallography, Massachusetts Institute of Technology. John Wiley & Sons, Inc. 1959. 347 pp. $12.00.

This book is a systematic exposition of vector space and its applications in crystallography. It has been written to fill the need for a more complete treatment of vector space than was hitherto available, in view of recent developments in crystal structure investigations. The scope is limited to the solution of this particular phase problem in order to increase its special value.

A general knowledge of crystal structure is assumed as a prerequisite for understanding the vector space approach to the problem for crystals of limited complexity. Only a few years ago such a treatise would have been premature, except as a chapter in a book on crystal structure analysis.

Applications of the vector space theory to the solution of crystal structure problems are described and adequately illustrated. E.D.C.

FACETING AND FLATS FOR FUN. Ralph Homesley, winner of the Henry B. Graves 1958 National Award for Faceted Gemstones of the American Federation of Mineralogical Societies. Published by Starnes-McKinzie, Brownwood, Texas. 1959. 57 pp. $3.00.

This book is written in simple language by a rockhound for use by rockhounds. It describes the art of faceting gems, including some of the more advanced cuts and designs. The specific operation of putting a flat mirror finish on flats and pagodas by a new technique is covered in detail.

In addition to the basic principles of faceting, Mr. Homesley has included an outline of the exact procedures followed in cutting some of the outstanding diamonds of the world, especially the Great Mogul Diamond. The reader should be able to follow his instructions and prepare a replica of this stone for his own collection. The chapter "Displaying Faceted Gemstones" should be worth the price of the book to would-be award winners. A glossary of faceting terms is a useful addendum.

E.D.C.

ANGULAR RELATIONS OF LINES AND PLANES WITH APPLICATIONS TO GEOLOGICAL PROBLEMS. Donald V. Higgs, Geologist, Shell Development Company, and George Tunell, Professor of Geology, University of California. Published by William C. Brown Company, Dubuque, Ia. 1959. 43 pp. $2.75.

This booklet is intended primarily for the student majoring in geology. Its purpose is to explain the basic principles underlying the two primary methods for solution of problems on the angular relations between lines and planes, namely, stereographic projection and spherical trigonometry. A working knowledge of these two methods is a prerequisite to solving either graphic or numerical problems concerning these relations.

Applications of these two methods are made in solution of ten typical problems, understanding of which should enable the reader to apply the principles to his specific problems. Examples of data determined by stereographic projection (stereographic net) are the apparent dip of a mineral bed in a drill core, and rotation of tilted mineral beds. Examples of data determined by spherical trigonometry are the angle between the plane of a mineral bed and the plane of a fault and the angle of plunge of their intersection, given the attitudes of the bed and fault.

Bibliography is included. E.D.C.

CLAYS AND CLAY MINERALS. Proceedings of the Sixth National Conference on Clays and Clay Minerals. Edited by Ada Swineford, State Geological Survey, University of Kansas. Sponsored by the Committee on Clay Minerals

(*Continued on page* 131)

"Grotto of the Redemption"

by RUSS KEMP

Entrance to cavernous Grottos showing superb statues made of white Carrara marble

NORTHWEST of Ft. Dodge, Iowa, midway between routes 18 and 20 is the town of West Bend. Here is a monumental work of one man showing Love for his God, religious faith, his rocks, and his fellow man. In this town the church of St. Peter and Paul is found, and our article begins in 1897, when Father Paul Dobberstein became pastor of this parish. In the early 1900's he began his work of attending his parish and building a grotto unmatched in the world today. It is a magnificent collection of rocks and minerals from all over the world with some specimens of which many museums would be envious. As Father Dobberstein kept no records, the exact cost or value of the grotto can only be guessed at but it is known that the imported figures of marble were obtained at a cost of over $100,000.

This originator of the grotto with the help of only one man, a member of his parish, until the arrival of Father Greving in 1946, constructed without blue prints, a mountain of rock with cave like passages and room sized grottos. It is over three stories high at its peak, easily covers more than one-half a normal city block and has been constructed from what has been estimated to be over 100 carloads of carefully collected rocks and stones, thousands of tons of cement and concrete, reinforced with railroad rails.

As you approach the grotto from the lakeside picnic area and parking lot, you see a large structure of barite, calcite, quartz crystal and petrified wood. The masonry work has been so cleverly done that no holding cements are visible. Ingenious passages and stairways of rock take you to the top of this shrine where there is an exact replica in white Italian marble of Michelangelo's Pieta, as found in St. Peter's in Rome.

When you visit the city of West Bend remember you are viewing the largest undertaking of this kind in the world today. Father Dobberstein spent over 50 years of his life on this project. The sheer bulk of the achievement is startling when you consider that most of the manual labor was done by two men and practically all the artistic work was done by Father Dobberstein singlehanded. This great and talented man passed away in July 1954*, at the age of 81, before his

work was completed. Father Greving has carried on this work and has many extensive plans for the future.

Actually the whole panoramic outlay of artistry is made up of nine grottos or scenes from the Life of Christ each of them portraying in rock and precious stones, a portion of the complete story of the redemption. These scenes each in their own grotto section show the Garden of Eden, Stable of Bethlehem, Home of Nazareth, Grotto of the Trinity, Ten Commandments, Gethsemane, The Fourteen Stations of the Cross and the Resurrection.

Stones and minerals which have been collected from all over the world to be incorporated in this work include, Agates of the States, Germany, and South America, and such other minerals as Alexandrite, Amber, Amethyst, Barite, Beryl, Bloodstone, Carbuncle, Carnelian, Chalcedony, Calcite, Chrysoberyl, Chrysophrase, Coral Emeralds, Gypsum, Hematite, Jacinth, Jade, Jasper, Jet, Lapis Lazuli, Lodestone, Malachite, Moonstone, Onyx, Pyrite, Quartz and Rock Crystals, Pearl, Ruby, Sapphire, Sard, Scoria, Serpentine, Stalactites and mites, Topaz, Turquoise, and Zircon. In addition, there are shells, fossils and extraordinary examples of petrifications, plus many Venetian Mosaics and imported Marble statues.

Regardless of your religious or personal beliefs you cannot help but be awed and inspired by this work of faith. Within the church itself precious stones have been worked into religious pictures and designs.

The Christmas chapel in the church is particularly beautiful and we were impressed with some of the malachite, polished brazilian slabs, a 2000 pound quartz crystal and a clump of perfect amethyst crystals weighing 300 pounds valued at more than $5000.00. No trip across Iowa is complete without a scheduled stop at West Bend. Leave your rock hammers in the car, but take your camera.

Naturally the grotto was constructed for a religious purpose but Father Dobberstein also recognized that the Love of precious stones is deeply implanted in the human heart and the cause of this must be sought not only in their coloring and brilliancy but also in their durability. The sheen and color of precious stones are the same today as they were thousands of years ago and will be for thousands of years to come. In a world of change this permanence has a charm of its own that was appreciated early in mankind and remains to this day. Besides the religious value then this is an exhibit of geological specimens which is unique and undoubtedly unequalled anywhere in the world. Who can properly estimate

General view showing the magnitude of the "Grotto of the Redemption"

Portal entrance to plaza surrounded by the fourteen "Stations of the Cross"

what tremendous educational value it will be to students of geology and lapidary in succeeding generations?

Our thanks to Father Greving for conducting us through the Grotto and for his permission to write this article using information obtained from the booklet on the Grotto. It is amazing what can be accomplished by one man possessed of patience and ability.

Ed. Note: For additional information concerning Reverend Paul M. Dobberstein, see obituary comment in October, 1954 issue of Earth Science, page 15. B.H.W.

(*Continued from page* 125)

stantiate the theory that people prior to the pre-lithic, pre-basket maker horizon of the Southwest, inhabited our shores and other inland parts. Crude artifacts found by the 1949 Smithsonian expedition at 192 archeological sites studied in the unglaciated upland Pleistocene areas, were very similar to previous finds unearthed at Fairbanks, Alaska in 1937. Nelson C. Nelson hinted that the artifacts were reminiscent of the Mesolithic era and that they were likened to ones he had found in the Gobi Desert.

Those artifacts may in time give more credence to the much disputed and oft times ridiculed supposed pre-glacial finds made in the Delaware valley and in the gravel beds of Trenton, New Jersey.

Though the overall picture of the antiquity of man in the Americas has been unnecessarily muddled, made bewildering and often misleading, it is to be remembered that there were no correlated research efforts in the beginning of American Archeology. It was more or less a matter of every group for itself, and in many instances every independent investigator for himself. Hence, the garbled picture presented in much of our too often times misleading literature on the subject.

To students and others interested in the antiquity of early migrants to this hemisphere, it is well to bear in mind the possibility of migrations of man from Europe prior to the arrival of the Norsemen. True, as of the moment such a possibility seems highly conjectural, but the marked resemblance of the shell mounds found in Greenland, the inlets of Labrador and along both our eastern and western shorelines, to the ascribed Paleolithic "Kitchen Middens" first found along the shores of the Scandinavian Peninsula, should warrant further investigations.

"Rockramas," Something New in the Midwest

by **RUSS KEMP**

THE individual club shows in the midwest have improved each year and are closely approaching professionally run shows. This is a very encouraging sign as it indicates closer cooperation between member clubs and that each year's experiences are adding prestige to our shows.

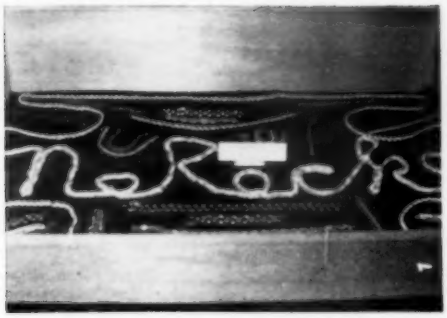
Now, something new is being added. This is the idea of sub-regional Rockramas, which was approved by the Midwest Federation at their Annual Convention held in Springfield, Ohio in June, hosted by the Miami Valley Mineral and Gem Club.

The Rockrama will be a sub-regional area participation show authorized by the Midwest Federation and sponsored by a host society. There has been a definite need for Rockramas as our Midwest Federation spreads over a thousand miles in all or parts of 11 or 12 states. Most of the clubs in this area, which has now been divided into four sub-regional sections, are affiliated and many new clubs are being added annually. The Federation each year has authorized a club to host the Annual Convention. Unfortunately, all rockhounds cannot vacation at the same time of the year nor can they all travel the great distances involved to attend these Annual Shows and Conclaves. Rockramas, it will seem, will eliminate these problems by providing a Federation authorized show in each regional area except the region holding the Annual Convention. In no way will the idea interfere with any of the local club shows.

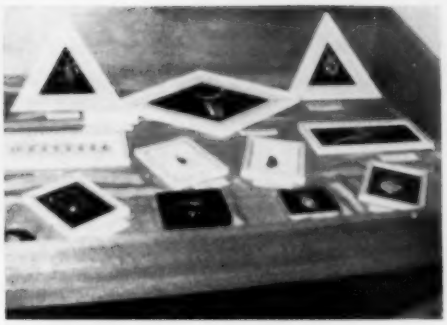
The theory of Rockramas and the principles which they wish to promote are a better understanding of our hobby, educational advancement, an opportunity for more clubs and club members to display their fine work and collections. These will preferably be non-competitive shows, the thought here being that many clubs and individuals enjoy displaying their material but not on a competitive basis. The Host Society, because these are area participation shows, would invite neighboring clubs to exhibit. They will invite special guest displays and arrange programs including, if possible, speakers of recognition as well as local speakers, working lapidary displays, educational exhibits and, if possible in their area, arrange guided field trips.

Sounds like a lot of work for a club; this is not, however, necessarily so. No club is too small to attempt "Rockrama," no town too small. And best of all, the Midwest Federation has established a Rockrama Division to help with these shows and hopes to be able to assist in many ways, from arranging for speakers to

Dency Brown admires exhibits at the Des Moines (Iowa) Gemarama Show



Silversmith exhibit by Jack Best



Special jewelry exhibit by Doris Kemp

suggesting guest displays that would be of interest.

Just to give you an idea of what one club accomplished this past year at their show, and incidentally this was the show at which the idea of Rockramas was formulated, I would like to present a slight recap on what took place in Des Moines, Iowa. Participation was the Key word at the Des Moines Lapidary Society show. This was a non-competitive show which included many fine displays, demonstrations, a well rounded program of speakers, an active swap room going full blast for two days, plus a good variety of cutting material and specimens which could be purchased from the Des Moines Club. The speakers included Hazen T. Perry, President of the American Federation, Lafayette Funk, President of the Midwest Federation, June Zeitner, Author of Midwest Gem Trails, Jack Best of the Chicago Lapidary Club, as well as several speakers from the Des Moines Lapidary Society.

This also was an area participation show as several other Iowa societies were invited to exhibit. Their special guest exhibits included those of Joe and Betty Phetteplace, from Wauzeka, Wisconsin; Lafayette Funk of Shirley, Illinois; Bill de Neiu, of Minneapolis, Minnesota; June and Al Zeitner of Mission, South Dakota; Doris Kemp and Jack Best of Chicago, Illinois. Standing room only signs had to be hung out for each speaker, some had to give a repeat performance. It is fairly estimated that over 5000 people were in attendance for this two day show. The experience they gained helped them greatly, and some day they will be host of a Midwest or American Federation Show. This is not a large club but it was their enthusiasm and cooperation that put this show over. The pictures accompanying this article were taken at the Des Moines show.

The Annual Convention or Conclave of the Federation will still be our big drawing card, but think of the experience and fun that will be had with Rockramas. I am looking forward to them with keen anticipation, and advise such affiliated clubs as may be interested in holding one this year to get in touch with their sub-regional committee at once.

Ed. Note: For your information the Midwest area has been divided geographically into four sub-areas: the Northern, Central, Southwestern and Eastern.

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of the National Academy of Sciences-National Research Council, and the University of California. Pergamon Press 1959, 411 pp. $8.50.

This report of the Conference Proceedings is by nature specific and technical since such conferences are designed to keep workers in clay mineralogy abreast of scientific developments in their field. Crystal structure, alteration of feldspars, clay mineralogy of soils, morphology of clay particles, water vapor sorption, and diageneses are discussed. Chapters of particular interest to the geologist are Factors Affecting Clay Formation and The Clay Petrology of Sediments. The dozen or more authors are associated primarily with U.S. or foreign universities, the Bureau of Mines, Mellon Institute, or the major petroleum companies.

Print designed for easy reading of text, tables, equations, graphs, etc., plus an index, contribute to the value of the book. It will serve as an excellent reference for courses in clay mineralogy, ceramics, agronomy, and petroleum engineering. E.D.C.

ILLINOIS ARCHEOLOGY. Bulletin 1, Illinois Archeological Survey, University of Illinois. Elaine Bluhm, editor. 1959. $1.00.

The purpose of the Survey, formed in 1956, is to bring together all available information on archeological sites in Illinois and record it by a uniform system. Persons acquainted with such sites or owning collections of artifacts are requested to contact the Survey. The project

(*Continued on page* 137)

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MIAMI VALLEY MINERAL AND GEM CLUB took time out from its busy schedule of preparations for the Midwest Federation's Convention to hear Joseph Long speak on April 12. Mr. Long, who is a metallurgical engineer from Columbus, Ohio, chose as his topic "The Geology and Paleontology of Ohio." He also announced that a troop of Boy Scouts from Columbus will feature a geological display at the Midwest Federation's Show on June 18-21.

DES MOINES LAPIDARY SOCIETY'S March meeting was sparked by a good talk by Dr. John Uchiyama on "The Esthetic Factors in Converting a Cabochon into Jewelry." He emphasized the potentials and uses of the V-lock, a method of mounting stones that was developed by the Des Moines Society.

At its April meeting the group heard a stimulating talk by Dick Brush, president of the Mid-Iowa Rock Club, who discussed his experiences in cutting and polishing fire opals.

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS on May 8 heard Dr. Cahn Bronner speak on the "German Jurassic." Dr. Bronner, prior to receiving his medical degree at the University of Strassburg, studied geology and did extensive field work in the Jurassic. The fossil formations which Dr. Bronner discussed were laid down in Germany some 150,000,000 years ago during the Jurassic period. There are 21 layers, each with well preserved index fossils that provide material for a clear evolutionary study of the period. Dr. Bronner amplified his talk with slides and actual specimens that he had collected.

NEBRASKA MINERAL AND GEM CLUB held a successful Rockfest on May 24 to raise money for its big fall show. Neighboring clubs were invited to participate. Its coming show will be held Sept. 26-27 in the large exhibition hall of the City Auditorium in Omaha. Its program will include exhibits, demonstrations in lapidary and jewelry work, films, lectures, agate hunting, and gold panning. At least a dozen dealers will have material for sale.

KALAMAZOO GEOLOGICAL AND MINERAL SOCIETY recently heard its president, Mr. C. M. Woolf, give a talk on "Growing Mineral Crystals." Samples of copper sulfate and potassium ferricyanide crystals that were grown in the laboratory were provided by Mr. Woolf. He announced that literature on how to grow crystals may be obtained from Crystalcraft Co., College Station, Texas.

CINCINNATI MINERAL SOCIETY on a very cold and windy day made a spring field trip to a limestone quarry near Mt. Vernon, Indiana, for calcite, pyrite and sphalerite crystals. Recently it held a mineral identification and swap meeting that was greatly enjoyed by its members.

CENTRAL ILLINOIS ROCKHOUNDS held a picnic meeting at Research Acres on June 7. They were the guests of LaFayette Funk, President of the Midwest Federation. A high light of the meeting was a visit to Mr. Funk's fabulous mineral collection.

MINNESOTA MINERAL CLUB reports that this year its annual show, which is held in April, was the best that it ever produced. The Alexandria Gem and Mineral Club, the Bloomington Mineral Club and the 3M Prospectors Club also participated and added a great deal to the show with their exhibits. Visitors came from all parts of the state and attendance topped the previous record of 14,000. A very popular feature was a gem identification booth. It attracted the usual number of glass "diamonds" and one very lovely piece of blue glass "jade." One visitor wanted to know if the spheres were colored light bulbs, and another asked if the rocks were varnished.

MICHIGAN MINERALOGICAL SOCIETY heard Dr. Kyril Spiroff, professor of mineralogy at the Michigan College of Mining and Technology, speak on "The Origin of Iron Formations" at its May meeting. As a consulting geologist, Dr. Spiroff has studied geologic formations in Mexico, Montana, the Carolinas, and Canada, but he stated that he spends most of his summers in the Upper Peninsula of Michigan because he believes it to be the most picturesque part of the United States and because its geology is the most baffling. This region is where the Midwest Federation's 1960 field trip convention will be held, July 1-4. The host society will be the Ishpeming Rock and Mineral Club and headquarters for the convention will be the Ishpeming Ski Hall of Fame.

CENTRAL IOWA MINERAL SOCIETY recently enjoyed a lecture by Dr. Charles L. Smith, archeologist, on "Digging up the Dirt." The club's lapidary division added to the evening's pleasures with a display of gems and jewelry.

CIMS warns that rockhounds should think twice before using a rockhammer because many a fine specimen has been ruined by a blow from a hammer. Some owners of agate claims are considering asking people to pay for agates and thundereggs that they have fractured with a rockhammer.

JOLIET MINERALORISTS SOCIETY'S final lecture of the season was given by Phil Cary, research metallurgist for the International Harvester Co., who spoke on "Crystals and Crystallization of Metals." Mr. Cary gave a very lucid explanation of x-ray diffraction in the testing of steels; some of the procedures were shown on film. His film on the growth of crystals was superb.

The society holds two meetings a month. The first one is a social gathering with a speaker or film of interest to the general membership and the second, termed work-nite, is conducted on an educational basis by Dr. Frank Fleener. This year the work-nite meetings were devoted to mineral identification.

CHANUTE GEM AND MINERAL SOCIETY was organized on March 3. Scherel Booe was elected as its first president. Meetings are planned for the first and second Tuesdays of each month and will be held in the Memorial Building in Chanute, Kansas. It is ideally located in the heart of the mineral, fossil and Indian Country.

CHICAGO ROCKS AND MINERALS SOCIETY'S exhibit of minerals, gems, fossils and Indian artifacts was attended by 1500 persons on April 11. The excellence of this show is best described by the remarks of two visitors. A representative from the Illinois Geological Survey said, "Of all the exhibits that I have attended, this is the only show put on by an amateur group that is actually of a professional caliber." A small boy looked up at his father and said, "Gee, Dad! thanks for bringing me to this show, it's swell!"

HEART OF AMERICA GEOLOGY CLUB recently heard Dr. A. C. Carpenter talk about "Hunting Rocks in Central and Eastern Missouri." The club is planning on printing copies of field trips recommended by Dr. Carpenter. Dr. Carpenter has an outstanding collection of fossils and many of the specimens in the collection were found in Missouri.

MADISON GEOLOGICAL SOCIETY viewed a color and sound movie on the newly opened St. Lawrence Seaway at its May meeting. The film was loaned to the society by the Nagle-Hart Tractor and Equipment Company of Madison, and showed step by step the construction of this marvel.

INDEPENDENCE GEM AND MINERAL SOCIETY has arranged to give six-week courses in Mineralogy, Paleontology, Lapidary, and General Collecting. The classes will meet one night a week and will be taught by members who are authorities in these fields.

New Light on the Great Lakes

by RUSSELL P. MacFALL

AMERICA'S middle west is greatly blessed with natural advantages, its rich fields tilled by the glaciers, drained by living rivers, and its highways open wide to the commerce of the continent. Its stimulating climate knows alike the warm rains of planting time, the hot days that make corn spring from the ground, and the spicy tang of the harvest season.

But the crown of these advantages is the five fingered inland sea, the Great Lakes, which floats the grain, the iron ore and the manufactures of the nation's heartland to market, and pours its wealth of waters into the operations of its oil refineries, its steel mills, and its automobile factories.

A recent study of the Great Lakes, written by Professor Jack L. Hough of the geology department of the University of Illinois, dramatizes some of their less obvious wonders and brings up to date knowledge of the complex geological processes of their formation.

Superior, monarch of the lakes, rises 602 feet above sea level, but it is so deep and mighty that at one point its bottom is 700 feet below sea level. Contrasted with it, Lake Erie has an average depth of only 58 feet. Among land locked bodies of water of the world, the Great Lakes are exceeded in size alone by the salty Caspian sea in Russia.

The lakes abound in fish and plant life because a providential device of Mother Nature prevents their waters from becoming stagnant. In the spring the temperature of their waters is almost uniform from surface to bottom of 39.2 degrees. It is a curious physical property of water that it is heaviest at that temperature, and that both colder and warmer water is lighter. In the spring, therefore, the wind and the currents move and mix this uniformly cold and dense water thoroughly, exposing it to the oxygen of the air, and ridding it of impurities.

In the summer, however, a warmer layer floats on the surface, and the heavier cold water stagnates underneath. In the fall comes a second overturn, as the scientists call it, which brings the water from top to bottom close to the uniform temperature of 39.2 degrees and again freely mixes and stores up oxygen for fish life. When winter comes, the surface layer is nearly at the freezing point, 32 degrees, and floats on the warmer water beneath.

The rocky basement on which these lakes lie was created in ancient geological times by shallow seas that flooded into the great midcontinental trough that extends from the Arctic to the Gulf. Corals and other tiny animals created the ooze that was compressed into thick beds of limestone. Mud and silt was turned into layers of shale.

After these seas receded, the region was drained by a river system that vanished eons ago. As reconstructed by the informed guesses of science, this system seems to have included an Upper Missouri river that poured its floods into Hudson Bay; a Lower Missouri that ran into a juvenile Mississippi which in turn flowed from the northwestern corner of Illinois into the central part of the state before veering toward its present bed. The vast area now drained by the Ohio river was in those times dominated by the vanished Teays river, which rose in the Appalachian plateau and coursed west through north central Indiana and east central Illinois.

Long after this time, the Great Lakes were born. By geological reckoning they belong to yesterday, a time about 20,000 years ago when the last glacier was in retreat. Like all lusty infants they changed

shape and size as the ice sheet tightened its grip or relaxed its hold. They have been as much as 220 feet deeper than their present level, and as much as 400 feet shallower.

Weathering of the rocks scooped out the bowls in which the Great Lakes lie. Streams and glacial scour cut away the weaker strata, especially where the strata were tilted, and left the stronger rocks to stand like sentinels along the margins of the lakes. The Niagara limestone, on which Chicago rests, is one of these harder rocks which set limits to the grinding action of the mile-thick glacial ice. Weak shales were eroded away to form the beds of Lake Michigan, Huron, Erie and Ontario. A mighty river guided the glacier into the bed of Lake Superior, where it attacked soft sedimentary formations but found the lavas and granites along the present shore too tough for its powers. The lavas, incidentally, are believed to have welled from ancient vents in which is now the lake bed.

The northeastern lobe of Lake Michigan is dotted with islands and outlined by a broken shore. Under this region once lay salt beds, such as are mined today in central Michigan. As they were dissolved by percolating waters, the rocky crust above them collapsed, creating the jagged upturned blocks visible today as islands and headlands. Across the top of the lake a river that once drained the melting glacier cut a well marked bed now hundreds of feet below the present surface.

The lakes and all midwestern landscape were molded into their familiar shape by the last of four major glaciers that ground, like the "mills of the gods," relentlessly across the region. Born and bred to irresistible strength in the frigid lands near Hudson Bay, each lived about 50,000 years before the advent of milder climates melted it away. The first moved slowly across the midwest a million years ago; another followed its track about 700,000 years ago, and a third nearly 300,000 years ago. The last one, remnants of which still exist in arctic areas, melted away a mere 10,000 years ago, so that the present age represents the beginning of another post-glacial temperate era.

As the ice of the last glacier advanced over the entire lakes region, then retreated, advanced again and began its last retreat, it opened and blocked channels through which its torrents from the melting ice could escape. Lakes grew at its foot as it wasted away, and as they grew deeper, they cut channels toward the sea. The first outlets were southwestward in the general area of Fort Wayne, Ind., and down the Wabash river valley, and past the site of present day Chicago via the Des Plaines and Calumet rivers and the canal system that drains them into the Illinois river. Later the dammed-up waters found a lower outlet through the Grand River across Michigan and down the Chicago outlet.

The whole complex evolution of the Great Lakes has been worked out by tracing the obscure lines of ancient beaches, glacial moraines, unusual soil types, etc., and by the fabulous new tool of geological discovery, radio carbon dating of organic materials, such as wood, found in beaches and moraines. Such detective work is difficult enough, but in Chicagoland it is complicated by tilting of the face of the land. As the enormous weight of the ice was removed, the surface gradually rose, moving like a vast trap door hinged in the Chicago region, and rising in the north even more than in the northeast. The evidence is so confusing that geologists still differ about its significance. Professor Hough's book, first of its kind in 40 years, gathers together what is known and conjectured about the subject.

All this would be of little interest, however, if it had not shaped the destiny of the midwest, dictated where its great cities would grow, gave its farmers flat, fertile fields, and set in the landscape of the nation's middle west its crowning glories, the Great Lakes.

OTHER SOCIETIES

ROCKLAND COUNTY MINERAL AND GEM SOCIETY on May 17 made a very successful field trip to Fonda, N. Y., to collect quartz crystals. Many beautiful "diamonds" were found and one member found a double terminated crystal as large as a grapefruit. On June 13 the society was scheduled to visit Franklin, N. J., to collect fluorescent minerals with the aid of portable black lights.

MIAMI MINERAL AND GEM SOCIETY started in May to make jewelry for its 1959 Christmas "give to re-give" project. The club plans to make more than 100 sets of jewelry to give to the patients in a nearby veterans' hospital so that they may give them as gifts to their families and friends.

MINERALOGICAL SOCIETY OF PENNSYLVANIA was permitted to visit Kibblehouse Quarry on April 18 to collect calcite, pyrite, aragonite, malachite and epidote. This quarry is closed to collectors, but because of MSOP's reputation for good behavior while visiting private and public property, and because the society is noted for observing safety rules, the owners of the quarry made an exception for one day only and granted the society permission to collect in the quarry.

COMPTON GEM AND MINERAL CLUB visited Horse Canyon on May 30 to collect agate. The agate found here is beautifully clear and colorful, the red variety contains green moss, dendrites and flowers. The canyon is a cove high in the Tehachapi Mountains and received its name from the prehistoric horses whose bones have been found in the canyon. On the hillsides of the canyon are several Indian caves.

TOPEKA GEM AND MINERAL SOCIETY heard Professor Edward Zeller speak at its April meeting. Dr. Zeller, who recently returned from the Antarctic, where he collected rock and ice samples for study, spoke on "Antarctica." He brought samples of the rocks to the meeting.

COLORADO MINERAL SOCIETY collected petrified wood, jasper and chert on the Lowry Bombing Range. Permission to collect on this range was granted for one time only. On May 24 the society visited the San Luis Valley to collect double terminated quartz crystals and dogtooth calcite.

EL PASO MINERAL AND GEM SOCIETY recently heard Mr. G. M. Percy of Alamagordo, New Mexico, tell about gem hunting in Wyoming. Some of the locations mentioned by Mr. Percy are: Just north of Casper, Fairbourne agate; Lander, apple and jade; Eden Valley, petrified wood; Dubois, agate casts of limbs and twigs; and north of Medicine Bow, blue dendritic moss agate.

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(*Continued from* p. 131)

is urgent because of the extensive changes in land levels which the tollway system of roads is effecting in some areas of the state and the danger that valuable sites may be buried beyond recovery.

Archeological study in Illinois is fairly recent. The first expedition, to explore Indian mounds at Cohokia, was led by Dr. Warren K. Moorehead in 1921. The information gained in the intervening years indicates that Indians lived in Illinois some 10,000 years before the early French and Spanish explorers came among them. Bulletin 1 summarizes the knowledge gleaned to date of the way of life of these Indians in the seven periods of time through which they developed their several strata of civilization. Maps, drawings of artifacts, and suggested readings are valuable supplements.

M.G.C.

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October issue ad deadline is August 10th!

Outstanding Agates of Oregon

by L. C. BIRDSALL

THE American and the Northwest Federation of Mineralogical Societies will hold their 1959 convention on Labor Day weekend in Portland, Oregon. For the benefit of our visitors from other states, it seems appropriate to speak of agates which can be found in Oregon.

Do you know that Oregon is one of the world's best agate collecting localities and has perhaps the greatest variety of agate to be found anywhere? Here volcanoes have showered over the land ashes rich in silica. Percolating waters have dissolved the silica and carried it to bubble holes and crevices in the lava below to form agates with most amazing patterns and colors, some even resembling living flowers (Priday plume nodules). Sometimes agate has replaced and taken the form of organic material. Beautiful agates can be found in many locations from the Coast to the Snake River; from the Columbia to Hart Mountain.

Some outstanding Oregon Agates (and Jaspers and obsidian) bear names relating to a characteristic or to past history:

THUNDER EGGS: Knobby spherical masses of silicified matrix filled with agate, which the Warm Springs Indians believed to be missiles hurled by angry mountain spirits during thunder storms. Now we know that these nodules, found in many locations, were formed in gas pockets in the lava and that storms washed them out of disintegrated rock on mountain slopes. A surprise awaits anyone who cuts a thunder egg and polishes its cut surface to look at the scene within. It will be something he has never seen before, because although "eggs" from the same location often have similar characteristics, two exactly the same are seldom found. The illustration shows E. E. H. Gain's thunder egg "Map of Oregon."

Thunder Egg "Map of Oregon"
Photograph by T. J. Bones

MOSS AGATE: Chalcedony containing minerals in black tree-like formations (dendrites) or as moss with various patterns of red, green, yellow and brown. Moss occurs in thunder eggs in some locations. An outstanding example is the Priday plume nodules, mentioned above, which are found near Madras. Huge seams of moss agate have been discovered at Antelope.

CAREY OR FLAME PLUME: Brilliant red plume that forms scenes resembling a brush fire has been dug on private property near Eagle Rock, southeast of Prineville.

WHITE PLUME AGATE: White feathery or plant-like formations in clear agate, found in several places. Material of good quality which does not undercut can be collected at Warm Springs Reservoir, near Juntura.

ANGEL WING: A white mass of agate well described by its name, found in Central Oregon in crevices and on overhanging cliffs, where only rock hounds would venture. It often contains magnificent red or white plumes.

SAGENITE: An interesting source of this agate is the coast near Yachats during winter storms. There a lucky rockhound may find a rough looking agate which when cut will show needle-like growth resembling "hair" against a clear background. The pattern is a zeolite mineral within the agate.

POLKA-DOT: White to almost clear chalcedony peppered with dots of red, yellow and brown which occurs chiefly in an enormous vein on private property near Madras. It is said that the Indians mined this material for arrow points and other implements by building fires over it and then throwing water on it. Today, after the location has been worked by rockhounds for many years, excellent material can still be dug from the large dumps which extends to the creek below.

IRIS AGATE: Chalcedony composed of many thin layers (around 16,000 per inch), usually colorless but it may have a yellow or red hue. When properly cut into a thin section and polished on both sides it will break up light into rainbow colors. This material is rare, occurring infrequently in a number of places where agate is found. Notable sources are the Antelope area and limb casts near Paulina.

CALAPOOYA PURPLE AGATE: Beautiful and unusual lavender-blue agate formed in seams and pockets, now weathered out. This material is found on private timber property along the Calapooya River near Sweet Home.

CARNELIAN: Various shades of carnelian are found in several locations. The Nehalem River near Vernonia has produced very good material.

TEMPSKYA: The fossil of a fern which lived about 75 million years ago and was one of the ancestors of our modern conifers. This brown or rarely red material shows eyes of lighter colors. It was discovered on the dump of the XL gold mine in the Greenhorn Mountains and may still be found in that area.

SWEET HOME WOOD: A prehistoric forest near Sweet Home produces beautifully colored fossilized wood, which shows its original structure.

NIGGER ROCK WOOD: Whole trees lie buried under gravel conglomerate near Nigger Rock, in Malheur County northwest of Owyhee Dam. This wood is blue, yellow and red and of excellent quality. It is difficult to find and difficult to dig.

MORISONITE: Picture jasper said to rival that found in the tombs of the Pharoahs, first discovered by rancher Jim Morison, high in the cliffs of the Owyhee canyon in Malheur County. This material sometimes shows brilliant colors in striking patterns, such as mountain scenes. Similar material found in other locations has been called Morisonite. An outstanding example is the beautiful porcelain jasper found in canyons at Hart Mountain and also known as "Hart Mountain High Grade."

OBSIDIAN: Volcanic glass. Preferred types are: silver sheen, gold sheen, iridescent (rainbow) and "double flow" of black and brown. Dense bubble-free material can be picked up on the surface at Glass Buttes, on Highway 20 east of Hampton.

The foregoing list, although not complete, describes a number of outstanding agates occurring in Oregon. Many of these can be found without much difficulty. However, it should be appreciated that considerable time and effort may be spent in searching for the "perfect piece."

Rockhounds who come to Portland for the convention will be able to see and to search for some of these materials. A map showing collecting locations in Oregon and neighboring states will be available. In addition, there will be several field trips to productive areas. One cross-state caravan will start immediately after the convention and will wind up in the eastern section of Oregon several days later.

* * *

Who, when he found one PEARL of great price, went and sold all that he had, and bought it. *Matthew 13:46*

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